Transport Canada Transports Canada

TP 1624

Marine Casualty Investigations

Enquêtes sur les accidents maritimes

Investigation Report to the Minister pursuant to sections 542 or 545 of the Canada Shipping Act

Rapport d'investigation au Ministre conformément aux articles 542 ou 545 de la Loi sur la marine marchande du Canada

Canada

Ce rapport est aussi disponible en français.

REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE STRIKING OF THE NEW WESTMINSTER RAILWAY BRIDGE, NEW WESTMINSTER, B.C., BY THE BARGE "CROWN FOREST NO. 4" ON NOVEMBER 28, 1987 AND BY THE BARGE "EVCO NO. 92" ON DECEMBER 17, 1987.

REPORT No. 510

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This report and its contents may be deficient and misleading if used in any other process and are not to be used or admitted in evidence in any legal proceedings, either civil or criminal, arising out of the casualty described in the report. The statements, opinions and findings in the report are those of the Marine Casualty Investigations Division only and do not constitute admissions made by or on behalf of Her Majesty the Queen in right of Canada.

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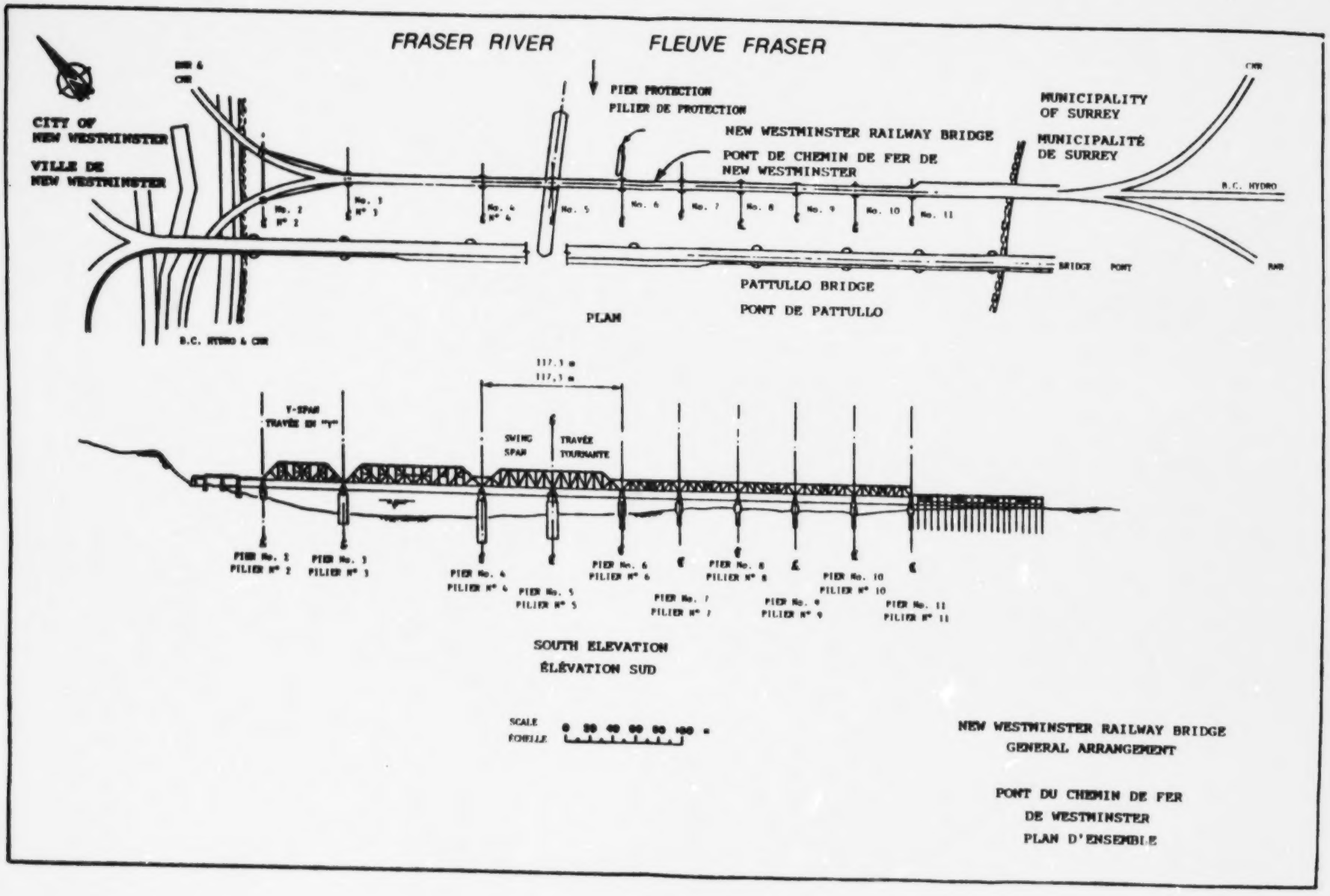

FRASER RIVER
FLEUVE FRASER
CITY OF NEW WESTMINSTER
VILLE DE NEW WESTMINSTER
B.C. HYDRO & CNR
PIER PROTECTION
PILIER DE PROTECTION
NEW WESTMINSTER RAILWAY BRIDGE
PONT DE CHEMIN DE FER DE NEW WESTMINSTER
MUNICIPALITY OF SURREY
MUNICIPALITÉ DE SURREY
B.C. HYDRO
CNR
BRIDGE
PONT
RAIL
No. 2
N° 2
No. 3
N° 3
No. 4
N° 4
No. 5
No. 6
No. 7
No. 8
No. 9
No. 10
No. 11
PATTULLO BRIDGE
PONT DE PATTULLO
PLAN
117.3 m
117.3 m
V-SPAN
TRAVÉE EN "V"
SWING SPAN
TRAVÉE TOURNANTE
PIER No. 2
PILIER N° 2
PIER No. 3
PILIER N° 3
PIER No. 4
PILIER N° 4
PIER No. 5
PILIER N° 5
PIER No. 6
PILIER N° 6
PIER No. 7
PILIER N° 7
PIER No. 8
PILIER N° 8
PIER No. 9
PILIER N° 9
PIER No. 10
PILIER N° 10
PIER No. 11
PILIER N° 11
SOUTH ELEVATION
ÉLÉVATION SUD
SCALE
ÉCHELLE
0 20 40 60 80 100 m
NEW WESTMINSTER RAILWAY BRIDGE
GENERAL ARRANGEMENT
PONT DU CHEMIN DE FER
DE WESTMINSTER
PLAN D'ENSEMBLE

Preamble

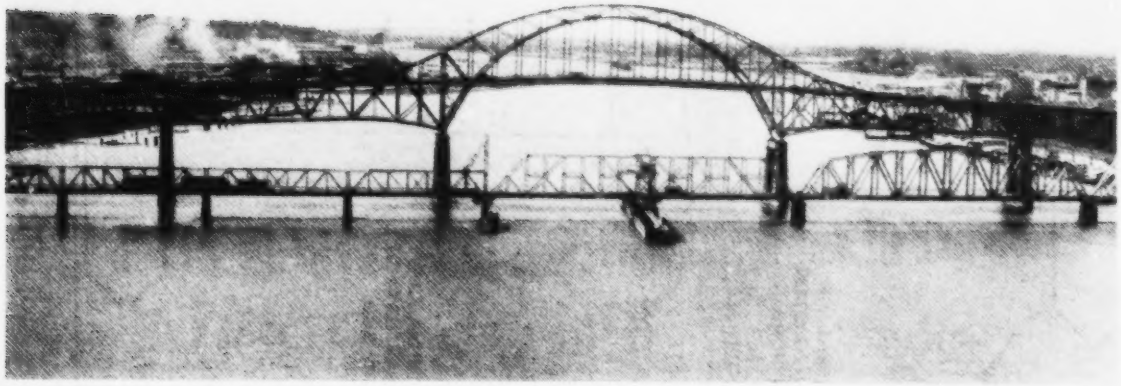
Within a period of 3 weeks, in late 1987, the New Westminster Railway Bridge was struck and damaged by marine barge traffic in the Fraser River on two occasions.

The earlier casualty, which occurred on November 28, 1987, caused considerable damage to, and dislocation of, the central swing span, with repairs estimated to cost approximately $1.7 million. The bridge was closed to rail traffic until December 23, 1987 and the costs estimated for rerouteing trains are in the order $1.5 million. The cost of damage to the barge involved was some $15,000.

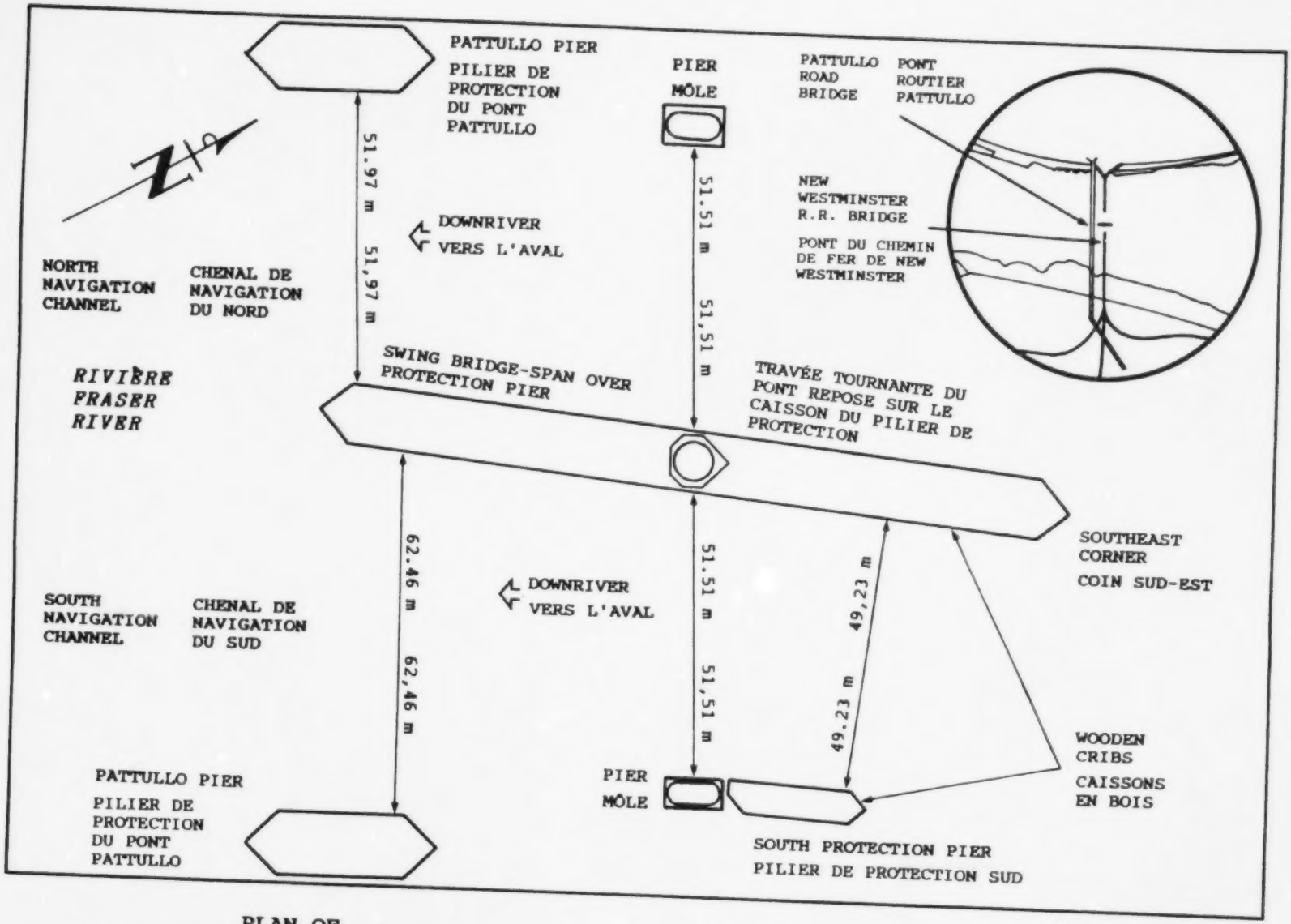
With repairs not yet completed, the swing span protection pier was again struck on December 17, 1987. Damage on this occasion was relatively light, being confined to some broken timbers and the cost of repairs was estimated at $13,000. There was no apparent damage to the barge involved in this casualty.

Because of the short time interval between these two similar casualties, the investigations are combined into one report. These casualties again emphasize the need for exercising extreme caution when navigating in the vicinity of vulnerable bridge structures.

Note: All times in this report are expressed in Pacific Standard Time (UTC minus 8 hours).



New Westminster and Pattullo bridges from the North.
Les ponts de New Westminster et de Pattulo vus du Nord.



PLAN OF
NEW WESTMINSTER RAILWAY BRIDGE
SWING SPAN SECTION

PLAN DE LA TRAVÉE TOURNANTE
DU PONT DU CHEMIN DE FER
DE NEW WESTMINSTER

New Westminster Railway Bridge - description

The New Westminster Railway Bridge was built in 1904 and spans the Fraser River between Surrey, on the south side, and New Westminster, on the north bank of the river, some 25 km upstream from its mouth. The bridge is owned by the Government of Canada, and the single track is used mainly by Canadian National (CN) Railways, B.C. Hydro and Power, and Burlington Northern Railway. The bridge is a vital railway link between Vancouver harbour and its hinterland, with approximately seven thousand train crossings annually and some five thousand bridge openings for marine traffic recorded for a similar period.

The bridge is approximately 610 m in length and incorporates a swing span 116 m long providing two navigation channels approximately 49 m wide (see sketch).

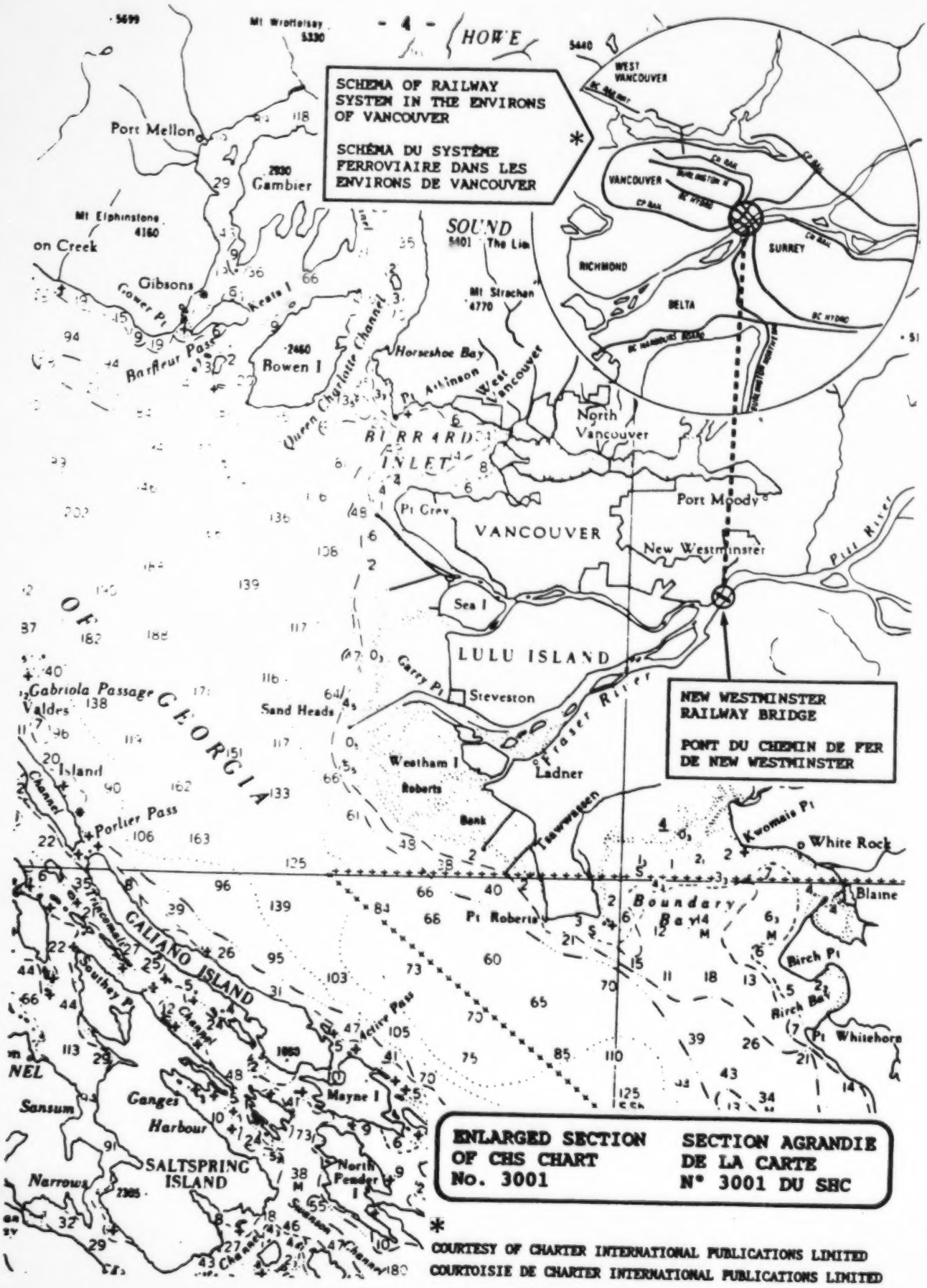
The bridge superstructure is comprised of simply supported steel through-truss spans resting on a number of slender non-reinforced concrete piers. The concrete pier supporting the swing span has a wooden protection crib built around it with its long axis extending some 60 m up and downstream on each side. This long east-west axis is skewed slightly in relation to the line of the bridge and is approximately in line with the direction of the downstream current; however it is sited just downstream of a bend and at a narrowing of the river and both factors induce turbulence.

The protection pier, designed to protect the swing span in its open position against being struck by passing vessels, is of heavy timber construction and is supported by numerous pilings driven into the river bed and strengthened by cross trusses between the walls.

The 'south' protection pier is of similar timber construction and extends some 25 m upstream from the concrete pier supporting the standing end portion of the south part of the bridge.

The New Westminster Railway bridge presents a special navigation hazard due to its relatively narrow swing span channels and high river currents with cross-flow and turbulence. There have been some 90 strikings recorded since 1950 to the present date, several of which resulted in heavy damage and extensive repairs and the resulting interruption of rail and sea traffic had an adverse economic impact. There were also numerous unrecorded striking incidents of a minor nature or consequence.

A study by the Aids and Waterways Branch of CCG, entitled Vulnerability of Bridges in Canadian Waters, rated the vulnerability of the New Westminster Railway Bridge at 7 out of a worst case scenario of 10.



ENLARGED SECTION OF CHS CHART No. 3001

SECTION AGRANDIE DE LA CARTE N° 3001 DU SHC

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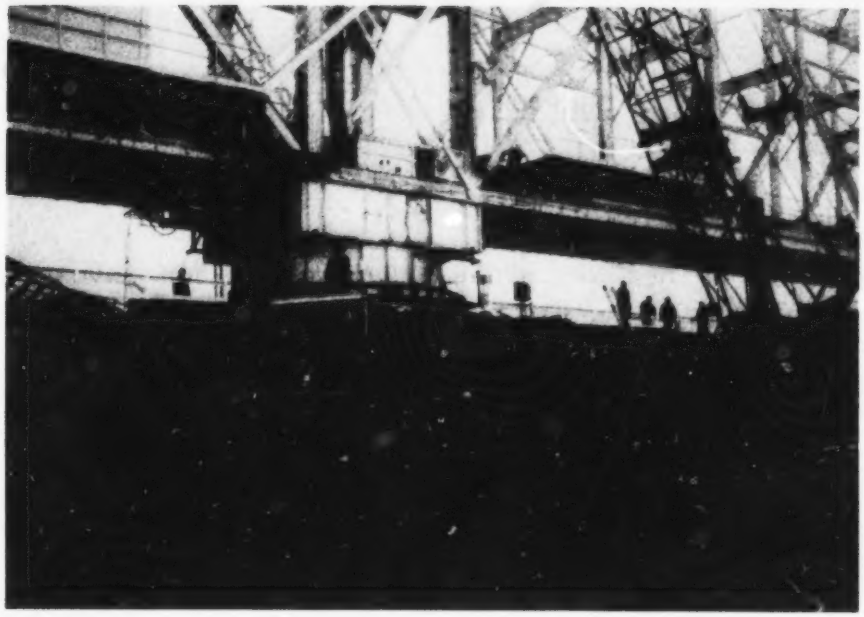
CHAPTER 2

Casualties

Strikings of New Westminster Railway Bridge involving:-

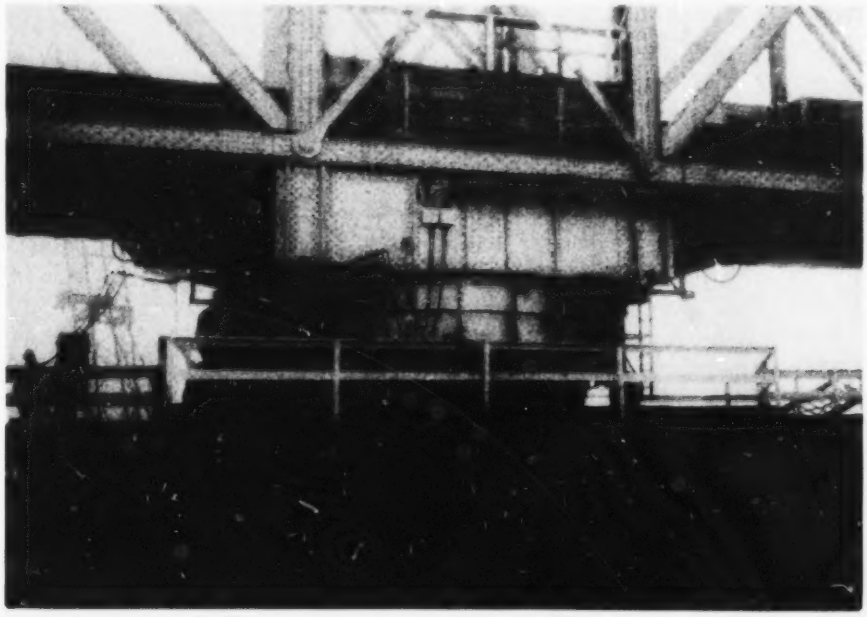
1. barge "CROWN FOREST No. 4" in tow of tug "JERVIS CROWN" with assist tug "WESTMINSTER CHINOOK"

2. barge "EVCO NO. 92" in tow of tug "PERSUADER"



Swing span, south side - point of impact. Damage to swing span - November 28, 1987 incident.

Travée tournante côté Sud - point d'impact. Travée tournante endommagée - accident du 28 novembre 1987.



Swing span, North side - note dislocated gears.

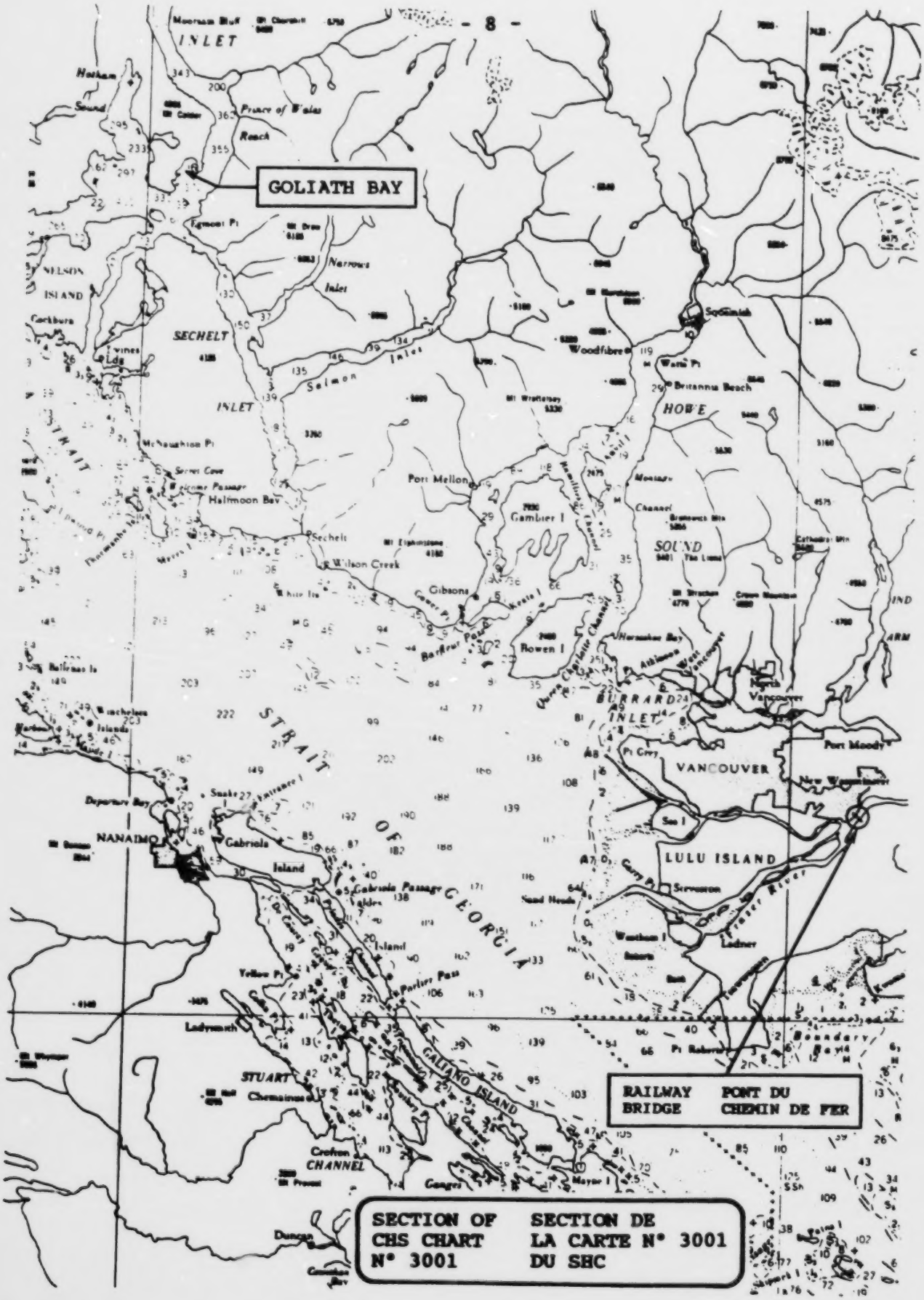
Travée tournante côté Nord - voir les engrenages disloqués.

REPORTS OF INVESTIGATION

1. REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE STRIKING OF THE NEW WESTMINSTER RAILWAY BRIDGE, NEW WESTMINSTER, B.C. BY THE BARGE "CROWN FOREST NO. 4" ON NOVEMBER 28, 1987.

Particulars of Vessels

Name	"JERVIS CROWN"	"CROWN FOREST No. 4" EX "CROWN ZELLERBACH No. 4"	"WESTMINSTER CHINOOK"
Official Number	383384	320217	395577
Port of Registry	Vancouver, B.C.	Vancouver, B.C.	New Westminster, B.C.
Call Sign	CZ 9581		VG 8903
Gross Tonnage	392.84	3715.22	60.15
Net Tonnage	58.26	3707.87	2.99
Length	32.3 m	105.16 m	14.69
Breadth	9.5 m	19.54 m	6.706 m
Depth	3.9 m	5.76 m	3.353 m
Draught	3.658 m Fwd 4.267 m Aft	1.219 m 1.219 m	
Type	Steel tug	Steel barge	Steel tug
Crew	7	None	2
Built	1977 Vancouver, B.C.	1963 Esquimalt, B.C.	1980 Vancouver, B.C.
Propulsion	Two Nohab Polar 1006 kW diesel engines driving two fixed-pitch propellers	non-self-propelled	Two GM 345 kW diesel engines driving two fixed-pitch propellers
Owners	Norsk Pacific Steamship Co. Vancouver, B.C.	Crown Forest Ind. Ltd., Vancouver, B.C.	Westminster Tug Co. Ltd., New Westminster B.C.


GOLIATH BAY
INLET
Prince of Wales Reach
Narrows Inlet
Salmon Inlet
SECHELT INLET
NELSON ISLAND
Halfmoon Bay
Port Mellon
Gambier I
Sechelt
Wilson Creek
Gibsons
Keats I
Bowen I
Woodfibre
Britannia Beach
HOWE SOUND
Horseshoe Bay
West Vancouver
North Vancouver
BURRARD INLET
Port Moody
Pt Grey
VANCOUVER
New Westminster
Sea I
LULU ISLAND
Steveston
Fraser River
Ladner
Boundary Bay
STRAIT OF GEORGIA
Departure Bay
NANAIMO
Gabriola Island
Gabriola Passage
Yellow Pt
Porlier Pass
Ladysmith
STUART Chemainus
GALIANO ISLAND
Active Pass
Mayne I
Crofton
CHANNEL
Duncan
Cowichan Bay
RAILWAY PONT DU
BRIDGE CHEMIN DE FER
SECTION OF CHS CHART N° 3001
SECTION DE LA CARTE N° 3001 DU SHC

The "JERVIS CROWN" was certificated as a Home Trade Class I vessel and her current annual inspection certificate (SIC 17) was issued by the Ship Safety Branch of the Canadian Coast Guard at Vancouver, January 16, 1987 and was valid until December 11, 1987.

Her towing equipment reportedly complied with the requirements of Part III of the Hull Construction Regulations.

The navigational equipment of the "JERVIS CROWN" included two radars, a gyro compass, echo sounder and two VHF radiotelephones; all equipment was reportedly in good working order.

The "CROWN FOREST NO. 4" is a steel log barge not required by regulations to be periodically inspected by the Ship Safety Branch of the Canadian Coast Guard. The barge was employed regularly in the transportation of logs from various logging camps to dumping locations on the Fraser River.

The "WESTMINSTER CHINOOK" is regularly employed in towing barges in the Fraser River area and assisting other tugs towing barges through the New Westminster Railway Bridge.

She is certificated for Home Trade Class III voyages. Her last Steamship Inspection Certificate (SIC 17) was issued on December 23, 1986 with an expiry date of August 27, 1988.

Background

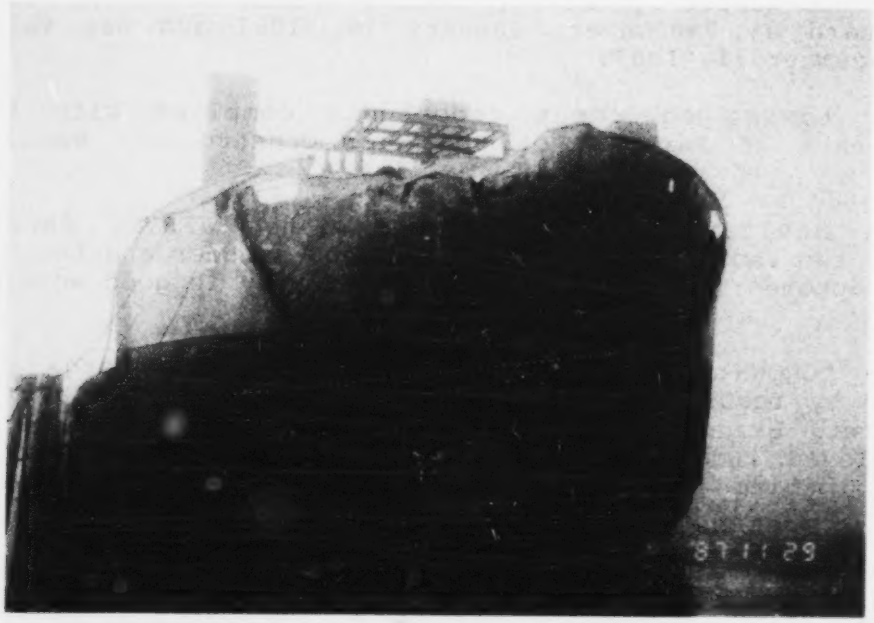
On November 28, 1987, the tug "JERVIS CROWN", towing the empty log barge "CROWN FOREST NO. 4", departed the Fraser Mills log dumping site at Coquitlam, on the Fraser River, bound for Goliath Bay, Jervis Inlet, B.C.

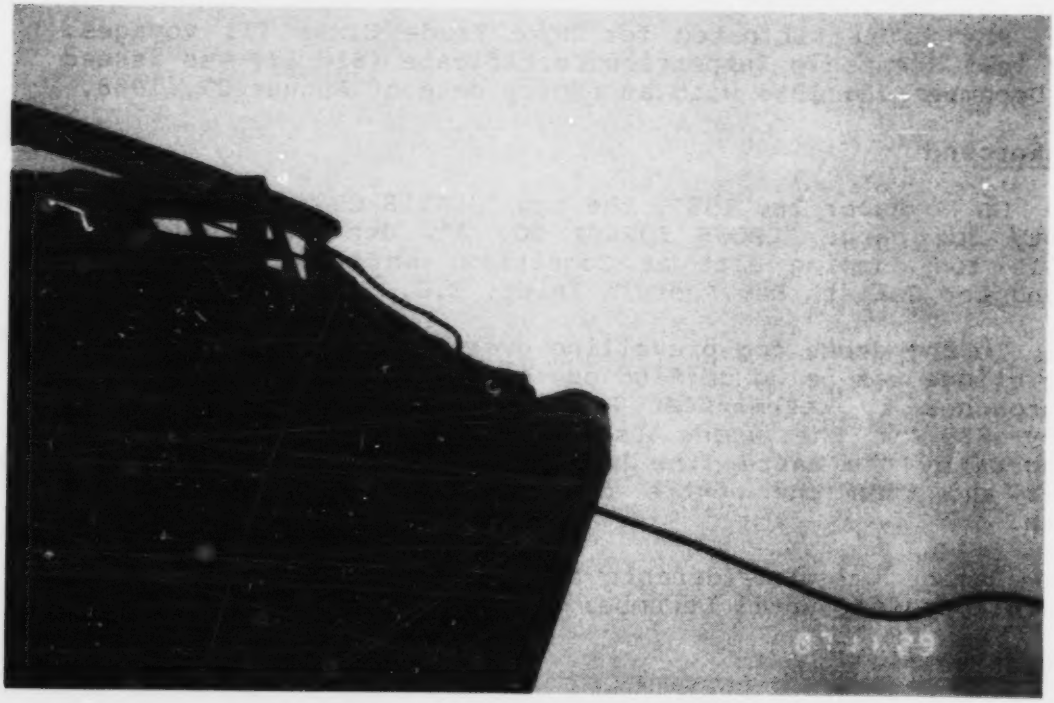
In the dense fog prevailing over the area, navigation to the bridge was being carried out entirely by radar and in the approaches to Westminster Railway Bridge the barge passed buoy S38 on the wrong (south) side. Despite immediate efforts by the master the barge struck the south protection pier and then the centre rotating structure of the swing span.

Damage was considerable and the bridge remained closed to rail traffic until December 23, 1987.

Narrative

At approximately 1630, November 28, 1987, the tug "JERVIS CROWN" secured her towline to the empty barge "CROWN FOREST NO. 4" and proceeded downstream on her trip to Goliath





Damaged bows - "CROWN FOREST N° 4".

Avants endommagés - "CROWN FOREST N° 4".

Bay, Jervis Inlet, B.C. Following a normal routine the master was steering and as visibility was very poor, he was navigating entirely by radar. The mate was monitoring the second radar in support of the master, the deck-hand was busy clearing the lines on the foredeck and the other crew-members were resting in their cabins.

The weather was calm, with dense fog prevailing in the lower Fraser Valley, reducing visibility to near zero in places. The tide was ebbing at a computed rate of 1.5 knots.

The engines were set at 6 knots, approximately half speed, and the tug was in VHF radiotelephone contact with the New Westminster Railway Bridge operator who had informed the tug that the bridge was open. The barge was following on a short towline approximately 10 m astern of the tug.

Approximately one mile from the railway bridge the assist tug "WESTMINSTER CHINOOK" caught up with the vessels and positioned herself on the starboard quarter of the barge ready to give assistance by pushing as required.

The master of the "JERVIS CROWN", anticipating the northerly set of the current, intended to keep the vessels close to buoys S40 and S38 while steering his vessel towards the centre of the south opening. However, after passing very close to buoy S40, the barge passed on the wrong side (south) of buoy S38 indicating that the vessels were not affected by the anticipated cross-current. The master applied starboard helm, however it was too late and the port bow of the "CROWN FOREST NO. 4" struck heavily against the south protection pier, bounced off to starboard and, at 1657, the starboard bow struck against the protection pier and the rotating structure of the swing span.

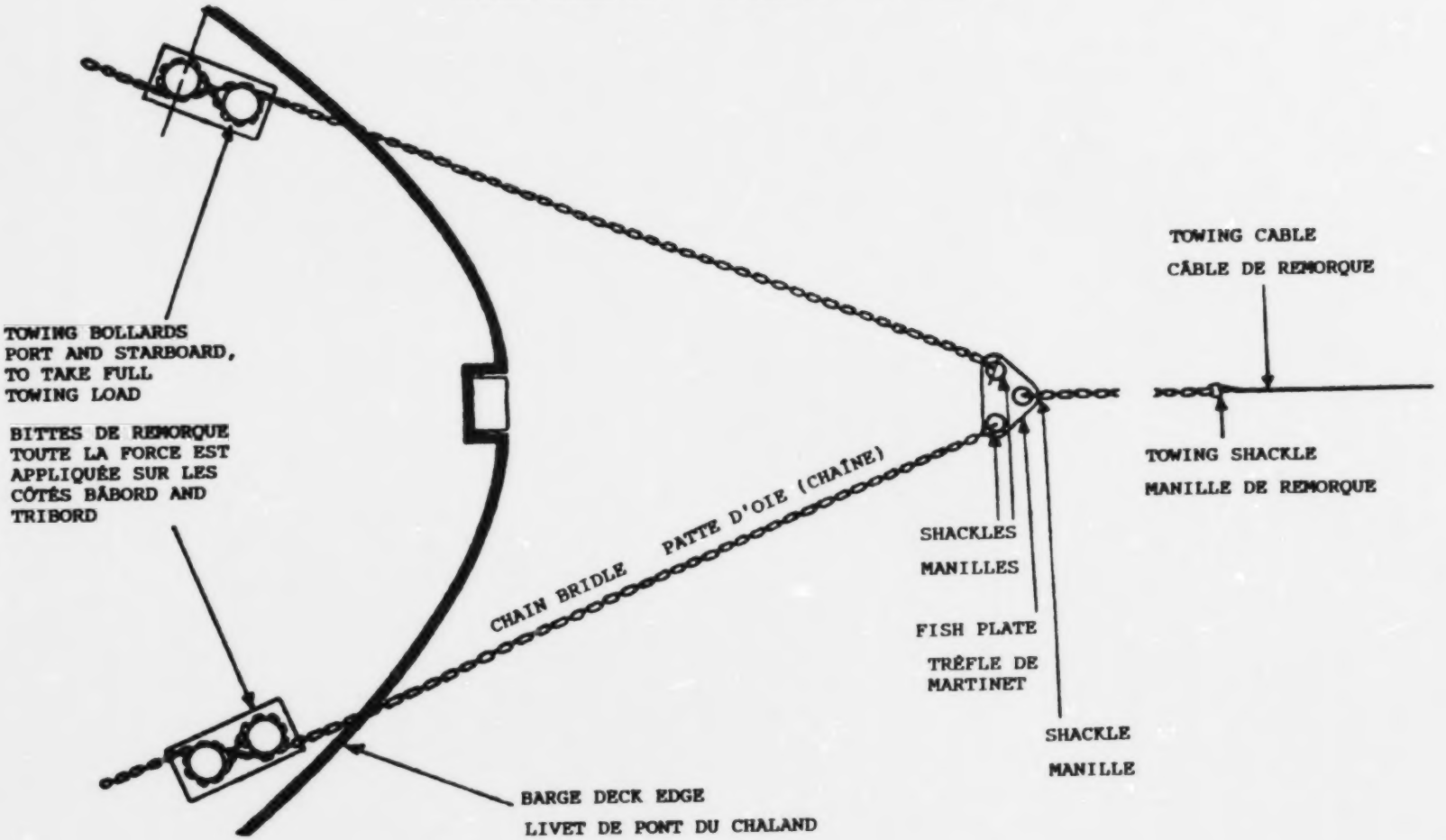
On impact the tow wire parted, the barge drifted downstream through the opening and within minutes, was caught by the "WESTMINSTER CHINOOK" which had followed her through. The "CROWN FOREST NO. 4" was then moored temporarily at the dolphins on the south side of the river for damage inspection.

Vessel Traffic Services (VTS) was immediately informed by the bridge operator of the incident and the appropriate Notice to Shipping was broadcast.

The south protection pier and the swing span protection pier were heavily damaged and there was dislocation of the swing span. The bridge remained closed to rail traffic for 29 days and the north navigation channel was closed because of construction barges moored there. The south channel was open to navigation but with restrictions on tugs towing barges.

"CROWN FOREST No. 4"

BARGE HOOK-UP ATTELAGE DU CHALAND



Analysis

1. Weather

On November 28, 1987 the weather at New Westminster was calm with a low lying fog bank covering the lower Fraser River Valley and reducing the visibility to several metres only, in places. Reportedly, the visibility in the vicinity of the bridge was reduced to less than 30 metres at times. The sun set at 1610 and by 1700 darkness had set in.

2. Tidal Conditions

High water in the area of the bridge had been at 1250 and the following low water would be at 2000. The calculated rate of the combined down-flowing current at 1700 in the vicinity of the New Westminster Railway bridge was 1.5 knots.

3. Towing arrangements

The barge "CROWN FOREST NO. 4" had a 6 m long studded link chain bridle secured at each bow, joined together to a fish plate to which a similar type chain pendant 9 m in length was attached. This pendant in turn, was shackled to the tow-line of the tug (see sketch and photographs).

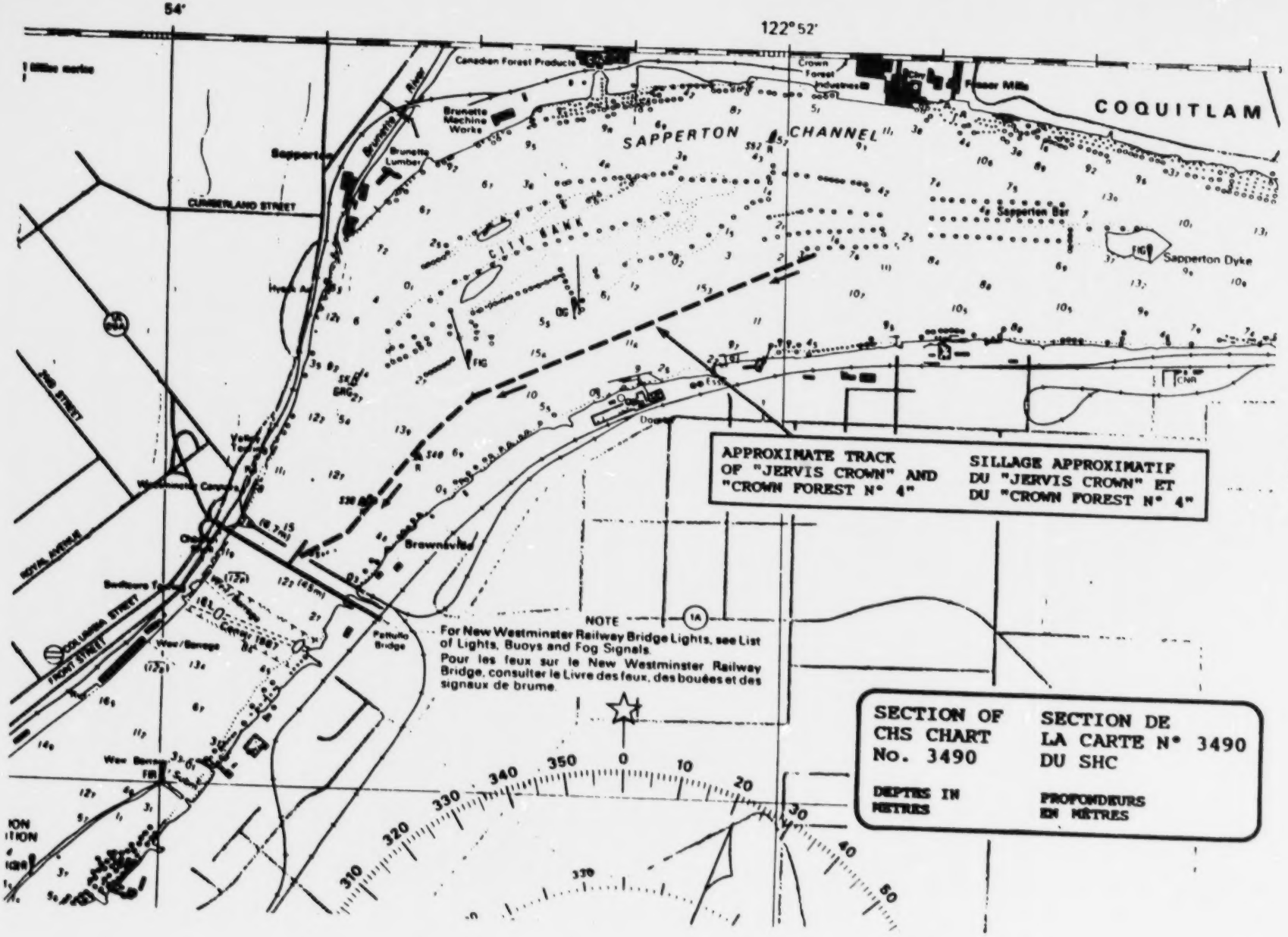
It was a normal practice when transiting the narrow channels, in order to have better control of the barge, to have the tow shortened to the minimum practical length of some 7 to 9 m.

The towing winch on the "JERVIS CROWN" was fitted with the required quick release/abort device, however it was unmanned at the time of the incident as the deck-hand was attending to other duties.

4. Approach to the bridge

The assist tug "WESTMINSTER CHINOOK" helped with letting go the moorings and, at about 1630, the "JERVIS CROWN" and the barge "CROWN FOREST" proceeded down river at a half speed of approximately 6 knots. The bridge operator confirmed by VHF radiotelephone that the swing span was open and ready for the tug.

The master of the "JERVIS CROWN" was steering the tug from the wheel-house and since the visibility was poor, was navigating entirely by radar. He was using the starboard radar close to the steering wheel whilst the mate was monitoring the port set and exchanging observations with the master.


54'
122°52'
SAPPERTON CHANNEL
COQUITLAM
Canadian Forest Products
Brunette Machine Works
Brunette Lumber
Fraser Mills
Crown Forest Industries
CUMBERLAND STREET
CITY BANK
Sapperton Bar
Sapperton Dyke
Brownsville
Patullo Bridge
COLUMBIA STREET
FRONT STREET
ROYAL AVENUE
NEW STREET
APPROXIMATE TRACK OF "JERVIS CROWN" AND "CROWN FOREST N° 4"
SILLAGE APPROXIMATIF DU "JERVIS CROWN" ET DU "CROWN FOREST N° 4"
NOTE
For New Westminster Railway Bridge Lights, see List of Lights, Buoys and Fog Signals.
Pour les feux sur le New Westminster Railway Bridge, consulter le Livre des feux, des bouées et des signaux de brume.
SECTION OF CHS CHART No. 3490
SECTION DE LA CARTE N° 3490 DU SHC
DEPTHS IN METRES
PROFONDEURS EN MÈTRES

The radars were set at ranges of 0.5 or 0.75 of a mile, with range rings at 500 ft (152 m) and both radars were reportedly working well.

In the vicinity of the buoy S40, the assist tug "WESTMINSTER CHINOOK" approached astern of the barge and positioned herself on the starboard quarter ready to give a 'nudge' if, and when required.

The tugs, guided by experience, acted independently and direct radio communication was not deemed necessary. However, although the assist tug had a radar set in operation and there was fair reception of echoes to starboard, being so close to the much larger barge, reception in the port bow sector was completely restricted. The "WESTMINSTER CHINOOK" was therefore not in a favourable position to know when her assistance in directing the tow would be required.

Following the usual practice, "JERVIS CROWN" was steering to pass buoys S40 and S38 close on the port side, heading into the centre of the south opening of the bridge. Reportedly, buoy S40 passed some 2 m off the port side of the barge but buoy S38 passed across between the stern of the tug and the barge and then close to its starboard side.

The master of the "JERVIS CROWN", realizing they were too far south of the centre leading line, applied starboard helm in order to correct their course, however, the barge, affected by the current, set heavily on the south protection pier of the bridge, bounced off to starboard and in spite of all the efforts made by the tug to regain control of the barge, its starboard bow struck the protection pier and the centre of the swing span steel structure: the time was 1657.

5. Damage to the bridge and piers

Damage as a result of the incident November 28, 1987 was:

The swing span was dislocated by approximately 0.5 m from its rotating centre and suffered extensive structural damage.

South wall timbers, supporting pilings, cross beams and trusses of the protection pier, sustained extensive damage (see photographs).

The wooden south protection pier of the first span of bridge was completed destroyed.

The cost of repairs was in the order of $1,700,000.

6. Damage to barge

"CROWN FOREST NO. 4": the barge plating sustained some damage on port and starboard bows, all above the water-line and the barge was towed to Jervis Inlet for repairs. The cost of repairs was in the order of $15,000.

7. Manning

The "JERVIS CROWN" was manned by a crew of seven which consisted of master, mate, two engineers, two deck-hands and a cook. The crew were working on a three week, watch aboard-watch ashore, rotating system. Each crew was divided into 2 six-hour watches: master, chief engineer and a deck-hand on the 6 to 12 watch and mate, 2nd engineer and a deck-hand on the 12 to 6. All crew members were reportedly well rested prior to assuming their duties.

It was a generally accepted routine that the master was always in charge of navigation whenever transiting the narrow bridges.

The tug's activities were controlled by a dispatcher with work scheduled generally three days in advance. The responsibility for completion of scheduled workloads was left to the master's discretion.

The "WESTMINSTER CHINOOK" carried a crew of two who worked days only.

The "CROWN FOREST NO. 4" is an unmanned barge.

8. Experience of personnel

The master of the "JERVIS CROWN" had an unrestricted Tug Master Certificate issued in 1954 however he did not have, nor was he required at that time to have, a radar observer's certificate; he had never attended a SEN I or SEN II course. He had some 46 years of service on board various tugs in B.C. waters of which the last 9 years he was in charge of the "JERVIS CROWN". He had a good knowledge of the Fraser River and the Regulations pertaining to navigation in the river and he has passed through the New Westminster Railway Bridge several times each year, in various weather, tidal and towing conditions.

The mate was a holder of a Watchkeeping Mate Certificate, with Master under 350 ton endorsement, and a Radar Observer's Certificate. He has some 20 years of service on various tugs in B.C. waters of which the last 9 were on board the "JERVIS CROWN".

The deck-hand on duty was a well experienced seaman and from the time he let go the moorings and attended to the towline, he was on the foredeck stowing away the ropes in readiness for sea passage.

The master of the "WESTMINSTER CHINOOK" held a Tug Master Certificate (under 350 tons) and had some 28 years experience on tugs of which the last 16 were with the present company.

Findings

On November 28, 1987 the empty barge "CROWN FOREST NO.4", in tow of the tug "JERVIS CROWN" and assisted by the tug "WESTMINSTER CHINOOK", struck and heavily damaged protection piers and the swing span of the New Westminster Railway Bridge. In consequence, the bridge remained closed to rail traffic for some 29 days but remained open with restrictions, to navigation.

It would appear that the following factors contributed to the casualty:

- dense fog prevailed in the area reducing visibility to less than 30 m in places;
- navigation in the approach was carried out entirely by radar;
- the vessels navigated downstream with a strong ebb tide;
- the "JERVIS CROWN" misjudged the effect of the cross-currents, and
- the assist tug was not effective.

Other Findings

The master of the "JERVIS CROWN" had no formal training in radar navigation.

There was no radio communication between the masters of the two tugs as they were so familiar with the operation.

The towline control levers on the "JERVIS CROWN" were unmanned.

ANNEX

NOTICES TO SHIPPING FOLLOWING NOVEMBER 28 CASUALTY

No. W2333
November 28, 17:15

The bridge closed to marine traffic until further notice.

No. W2334
November 28, 19:30

Vancouver Traffic advises that the large section of the New Westminster Railway Bridge protection pier has broken off and may be a menace to navigation. Mariners are requested to proceed with caution in the area.

No. W2335
November 28, 19:30

The bridge master New Westminster Railway Bridge advises that the centre swing span has been severely damaged and represents a serious danger to vessels in transit. The bridge is ordered closed to all marine traffic until further notice.

No. W2338
November 29, 16:00

Vancouver Traffic advises that the New Westminster Railway Bridge protection pier has been recovered - cancels No. W2334.

No. W2401
December 4, 1987, 17:10

The Fraser Port Harbour Master advises that transits of the New Westminster Railway Bridge will occur under the conditions below until further notice. All mariners requested to approach and use extreme caution when transiting the swing span as the protection works now support the swing span. Contact with the protection works may destabilize the span and endanger workmen.

Operating Conditions

1. All vessels unable to pass under any other part of the bridge must use the south opening of the swing span. The north opening will be encumbered by construction equipment.

2. All vessels requiring a transit through the swing span must contact the bridge operator on VHF channel 74 prior to the transit.

3. All vessels must proceed at slow speed to avoid excessive bow waves.

4. Vessels may only transit when stemming the current.

5. During daylight hours, vessels with single tows will be permitted to transit when attended by an assist tug (FRHC BY-LAW 54).

6. No vessel with a beam or load width greater than 22.86 M may transit the south opening.

7. The south opening will be closed to all vessels with tows during hours of darkness, strong winds and visibility less than 1/2 mile.

8. Vessels without tows may transit the south opening day or night in appropriate weather after contacting the bridge operator on VHF channel 74.

9. Transits of the south opening by deep-sea vessels is prohibited until further notice.

Mariners are advised it is tentatively planned to place the bridge in the closed position December 10, 1987 to January 5, 1988 for alignment work. Mariners will be advised by December 14, 1987 of the exact date.

This cancels W2335.

No. W2572
December 18, 18:00

Fraser River Harbour Commission advises that effective 0800, December 19, transits of the New Westminster Railway Bridge will be allowed under conditions set forth in Notship W2401.

No. W2642
December 31, 11:45

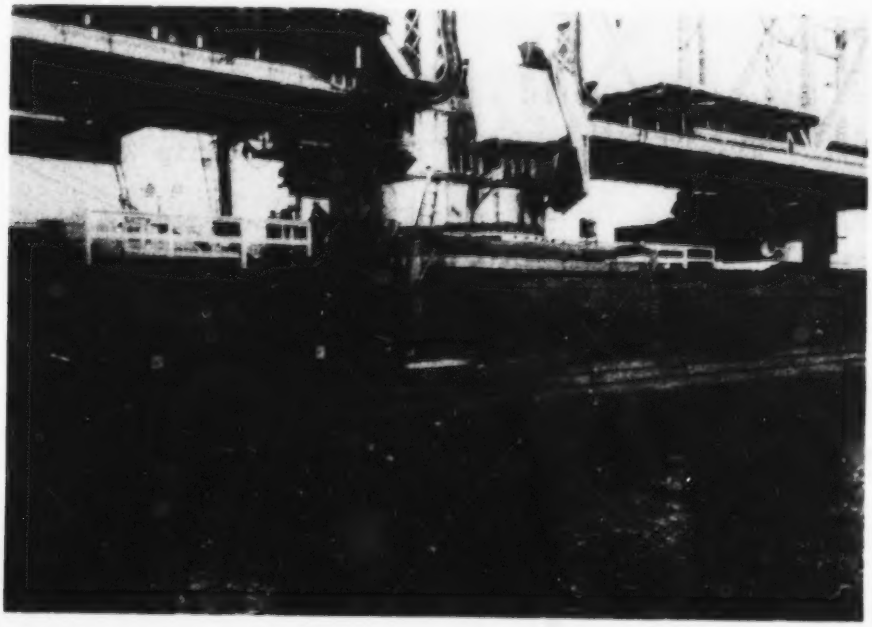
The Fraser Port Harbour Master advises that the current closure of the New Westminster Railway Bridge to marine traffic (referred to in Notship W-2401) has been extended to 0800, January 6, 1988.

Cancels W.2572

Notice No. W2401 was in force on December 17, 1987, when the second casualty occurred as the tug "PERSUADER" and the barge "EVCO NO. 92" transited the bridge.

December 17, 1987 incident.

Accident du 17 décembre 1987.



Protection pier - south wall - damaged timbers.

Pilier de protection - mur de sud - madriers endommagés.

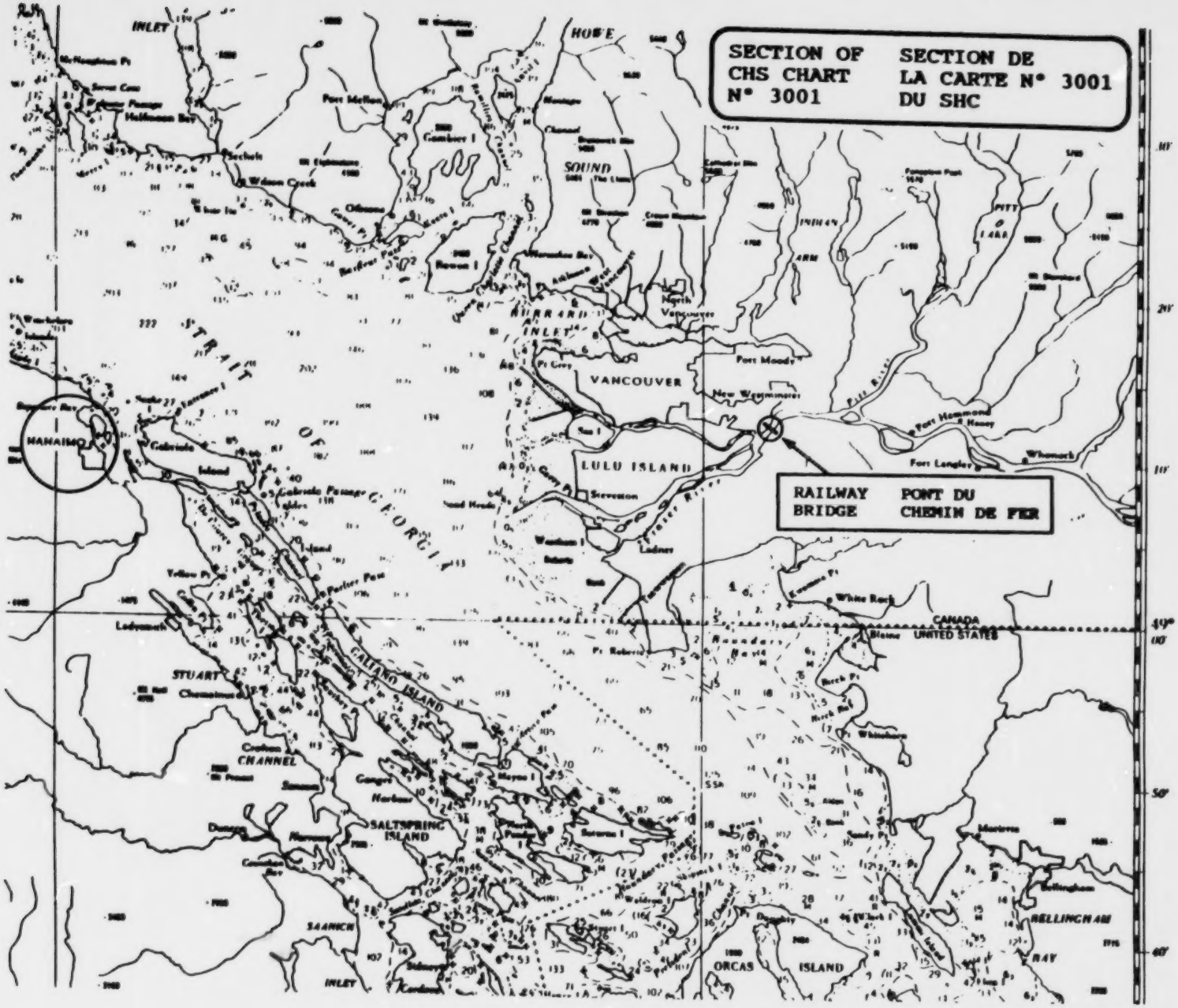
2. REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE STRIKING OF THE NEW WESTMINSTER RAILWAY BRIDGE, NEW WESTMINSTER, B.C. BY THE BARGE "EVCO NO. 92" ON DECEMBER 17, 1987.

Particulars of Vessels

Name	"PERSUADER"	"EVCO NO.92"
Official Number	344942	331865
Port of Registry	Nanaimo, B.C	Vancouver, B.C.
Call Sign	CZ 2589	-
Gross Tonnage	9.98	1710.86
Net Tonnage	6.79	1710.86
Length, Overall	10.24 m	65.84 m
Breadth	3.90 m	17.07 m
Depth	1.25 m	4.72 m
Draught	1.00 m Fwd 1.98 m Aft	0.60 m Fwd 0.60 m Aft
Type	Steel tug	Steel barge
Built	1972 Port Alberni, B.C.	1969 North Vancouver, B.C.
Propulsion	Twin diesels, total power 402 kW driving twin fixed-pitch propellers	Nil
Owner	Hub Towing Ltd., Nanaimo, B.C.	Ocean Construction Supplies Ltd. Vancouver

The "PERSUADER" is a small uninspected tug engaged in tending barges in B.C. waters.

The two diesel engines are directly controlled from the wheel-house and the flying bridge. Navigational equipment included radar, echo sounder and two VHF radiotelephones, all in good working order. The towing equipment reportedly


SECTION OF CHS CHART N° 3001
SECTION DE LA CARTE N° 3001 DU SHC
RAILWAY BRIDGE
PONT DU CHEMIN DE FER
VANCOUVER
NANAIMO
LULU ISLAND
GALIANO ISLAND
SALTSPRING ISLAND
ORCAS ISLAND
CANADA
UNITED STATES
STRAIT OF GEORGIA
BURRARD INLET
SOUND
INLET
CHANNEL
BAY

complied with the requirements of Part VIII of the Hull Construction Regulations.

The "EVCO NO. 92" is a typical flat deck scow used for carrying gravel, rock or other similar cargoes in B.C. waters. It has an approximately 3 m high box surrounding the deck and when in the light condition on even keel, it has some 3.5 m of freeboard.

Three heavy rubbing timbers are fitted on both sides running in a fore and aft direction. The top rubbing timber is on an approximate level with the deck, with the second one some 1.5 m below and the third on approximately 1 m lower and just above the light draught waterline. The rounded corners of the scow at deck level were protected by fixed rubber fenders (see photographs).

Background

On December 17, 1987, the tug "PERSUADER" was towing the empty scow "EVCO NO. 92" from a berth upstream of the Westminster Railway Bridge to Nanaimo, B.C.

The tug, aware that repairs to the bridge were in progress, headed straight through the south opening without reporting to the bridge operator by VHF radiotelephone.

At approximately 2215, the time when the barge was passing through the bridge opening, the repair crew, then on a coffee break, heard a loud splintering noise and ran out to see the stern light of a vessel disappearing downstream.

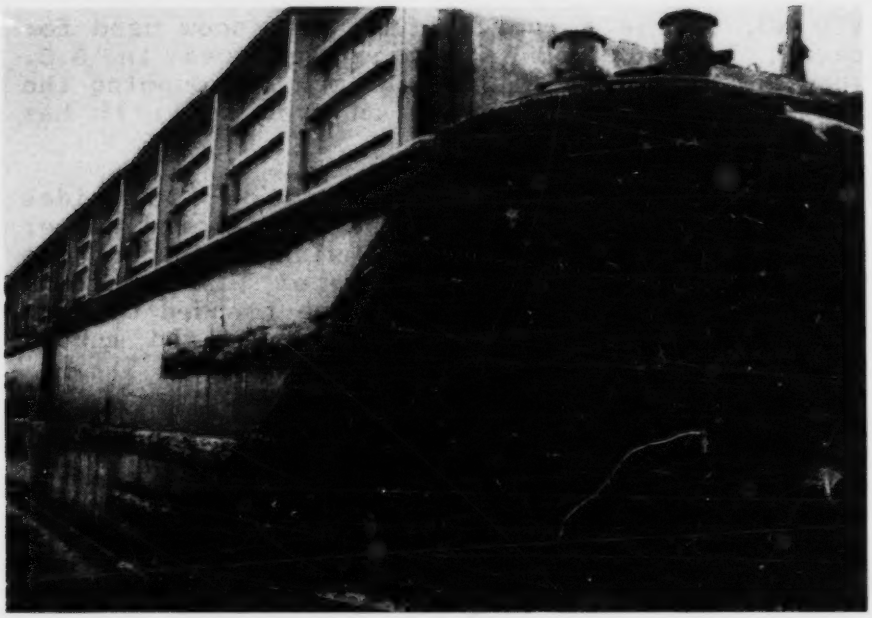
The bridge operator immediately dispatched the service tug "CHOWIKA" to follow the light. Approximately one hour later the "CHOWIKA" overtook the tow and identified the "PERSUADER" and her scow "EVCO NO. 92".

Repair work on the span was interrupted until it was inspected and found safe to continue.

Narrative

In the evening of December 17, 1987, the tug "PERSUADER" following her instructions for the day, proceeded up the Fraser River to the east side of the New Westminster Railway Bridge in order to take the barge "EVCO NO. 92" in tow for Nanaimo, B.C. The barge was moored at the Ocean Depot 41 wharf which was located on the south bank some 500 m upstream of the bridge.

The tug used a short tow and, at approximately 2200, proceeded upstream and around the S40 buoy in order to make a good approach to the south opening through the bridge. The tug was proceeding at a half speed of some 5 knots, with the



"EVCO 92" - starboard bow.
"EVCO 92" - tribord avant.

"EVCO 92" - starboard quarter.
"EVCO 92" - hanche de tribord.

barge following some 10 m astern.

The weather was fine and clear and the tide was ebbing at a computed rate of 2.7 knots.

The operator knew that the bridge was undergoing repairs but he was, reportedly, not aware of any restrictions in force with regard to navigation through the bridge. The span was in the open position with the working lights on, and the "PERSUADER" did not communicate by VHF with the bridge operator before commencing the bridge transit.

Passage through the opening appeared to progress in a normal manner and it was only approximately one hour later, when the service tug "CHOWIKA" overtook the "PERSUADER", that the master became aware that the barge had struck the protection pier.

At 2215, the approximate time the "PERSUADER" passed the bridge, the repair crew having a coffee break in the trailer barge heard a loud cracking sound and felt a shudder coming from the other side of the swing span protection pier. When they ran out on deck they saw a light disappearing on the west side of the bridge and some broken timbers on the swing span protection pier.

The bridge operator immediately sent the service tug "CHOWIKA", standing by the construction barge, in pursuit of the vessels which were later identified as tug "PERSUADER" towing the scow "EVCO NO. 92".

There was no pollution and damage was confined to a number of broken timbers on the protection pier and there was no reported damage to the scow. The "PERSUADER" and "EVCO NO. 92" continued to Nanaimo, B.C. without further incident.

Analysis

1. Weather

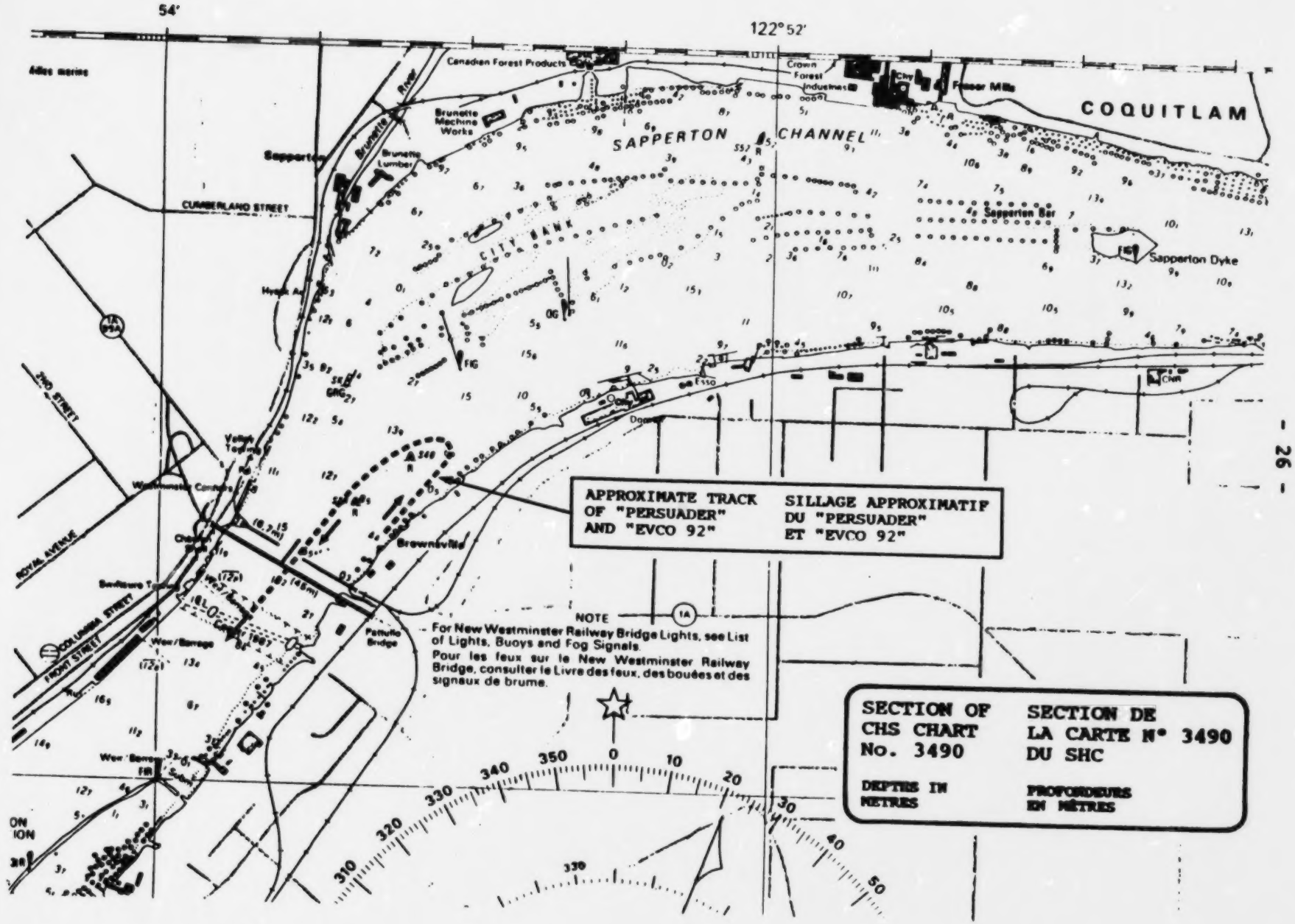
On the night of December 17, 1987 the weather was calm and fine, with good visibility.

2. Tidal conditions

Low water at New Westminster was at 2330 and the computed rate of the downflowing current was 2.7 knots.

3. Towing Arrangements

At the wharf, a 5 cm diameter polypropylene bridle was attached to the scow "EVCO NO. 92" with some 8 m of towline from the bridle to the tug.


54'
122°52'
Atlas marine
Canadian Forest Products
Crown Forest Industries
Fraser Mills
COQUITLAM
SAPPERTON CHANNEL
Brunette River
Brunette Machine Works
Brunette Lumber
Sapperton
CUMBERLAND STREET
CITY BANK
Sapperton Bar
Sapperton Dyke
Fisso
Chm
Brownsville
ROYAL AVENUE
2ND STREET
COLUMBIA STREET
FRONT STREET
Patullo Bridge
Wor/Barrage
APPROXIMATE TRACK OF "PERSUADER" AND "EVCO 92"
SILLAGE APPROXIMATIF DU "PERSUADER" ET "EVCO 92"
NOTE
For New Westminster Railway Bridge Lights, see List of Lights, Buoys and Fog Signals.
Pour les feux sur le New Westminster Railway Bridge, consulter le Livre des feux, des bouées et des signaux de brume.
SECTION OF CHS CHART No. 3490
SECTION DE LA CARTE N° 3490 DU SHC
DEPTHS IN METRES
PROFONDEURS EN MÈTRES

The deck-hand was positioned aft at the towing winch controls. From this position, looking aft, he could only see the bows of the barge towering over the stern of the tug.

The master was steering the tug from the flying bridge.

4. Approach to the bridge

As the "PERSUADER" proceeded upstream through the south channel of the New Westminster Railway Bridge to the Ocean Depot 41 wharf, some 500 m upstream on the south bank to pickup the "EVCO NO. 92" the master noticed that repairs were in progress.

After securing the tow, the "PERSUADER" then continued at full speed upstream in order to round the S40 buoy and align the tug and barge on the approach downbound to the channel. She then reduced her speed to half and passed some 15 m north of buoys S40 and S38.

At 2215 they passed through the bridge opening at approximately 6 m distance from the protection pier without noticing anything unusual. The span was well lit with flood lights but no workers were seen at that time working on the swing span.

Since the "PERSUADER" was in an area outside the Vessel Traffic Reporting System, she was not obliged to keep the radio on the VTS calling channel 74 but should have been monitoring channel 16. The tug, however, had its radio tuned to channel 72.

At 2335, the "CHOWIKA", in pursuit of the "PERSUADER", contacted her on channel 72 and verified she was the vessel that had passed through the bridge at approximately 2215. The master was reportedly unaware that his barge had struck the span.

5. Damage to the bridge and piers

Damage as a result of the December 17, 1987 incident was confined to a few broken timbers in the swing span protection pier.

It is estimated that further repair costs of $13,000 were incurred by this striking.

6. Damage to barge

There was no reported damage to the barge "EVCO NO. 92" as a result of this incident.

7. Manning

The tug "PERSUADER" is manned by a crew of two and the "EVCO NO. 92" is an unmanned barge.

8. Experience of personnel

Since the tug was under 15 tons gross she was not required to have, nor did she have a certificated master, however her operator had some 23 years of service on various tugs in B.C. waters and for the last 15 years was in charge of the "PERSUADER". During these years, he had towed barges above the New Westminster Railway Bridge approximately once a year.

The deck-hand had some 6 years sea experience.

Findings

On December 17, 1987 the empty barge "EVCO NO. 92" downbound in tow of the tug "PERSUADER", stuck and damaged the south wall of the protection pier of the swing span of the New Westminster Railway Bridge.

It would appear that the following factors contributed to this casualty:

- the "PERSUADER" did not comply with Notice to Shipping No. 2401 in that:

  a) transit was undertaken during the hours of darkness,

  b) the bridge operator was not contacted prior to transit, and

  c) the vessel was not stemming the current;

- the current was running at about 2.7 knots with the ebb tide.

Other Findings

"PERSUADER" and "EVCO NO. 92" were the only vessels which passed through the open span at that time.

The master of the "PERSUADER" reportedly had no knowledge of any restrictions on navigation through the bridge being in force at that time.

The tug "PERSUADER" had no difficulty negotiating the passage through the opening and the master was reportedly unaware the barge had made contact with the protection pier.

The "PERSUADER" was not monitoring channel 16 VHF.

CHAPTER 3

General Analysis

1. Navigation restrictions

Under normal operating conditions there are no restrictions on navigating this part of the river on account of weather, current or visibility; it is left to the master's discretion to decide whether or not it is safe to proceed. The Fraser River Harbour Commission By-Laws in fact set out procedures for operating the bridge both at night and in restricted visibility.

A reference in the study, Vulnerability of Bridges in Canadian Waters, to navigation being suspended during hours of darkness and at times of poor visibility, in practice refers only to ocean-going vessels of which the last one passed through the bridge some two years ago and at that time the pilots had restricted pilotage to daylight hours only. Restrictions regarding night passages and draught and current restrictions are laid out in the Fraser River Pilots Association Despatch Manual but these do not apply to craft which are not under the conduct of a pilot.

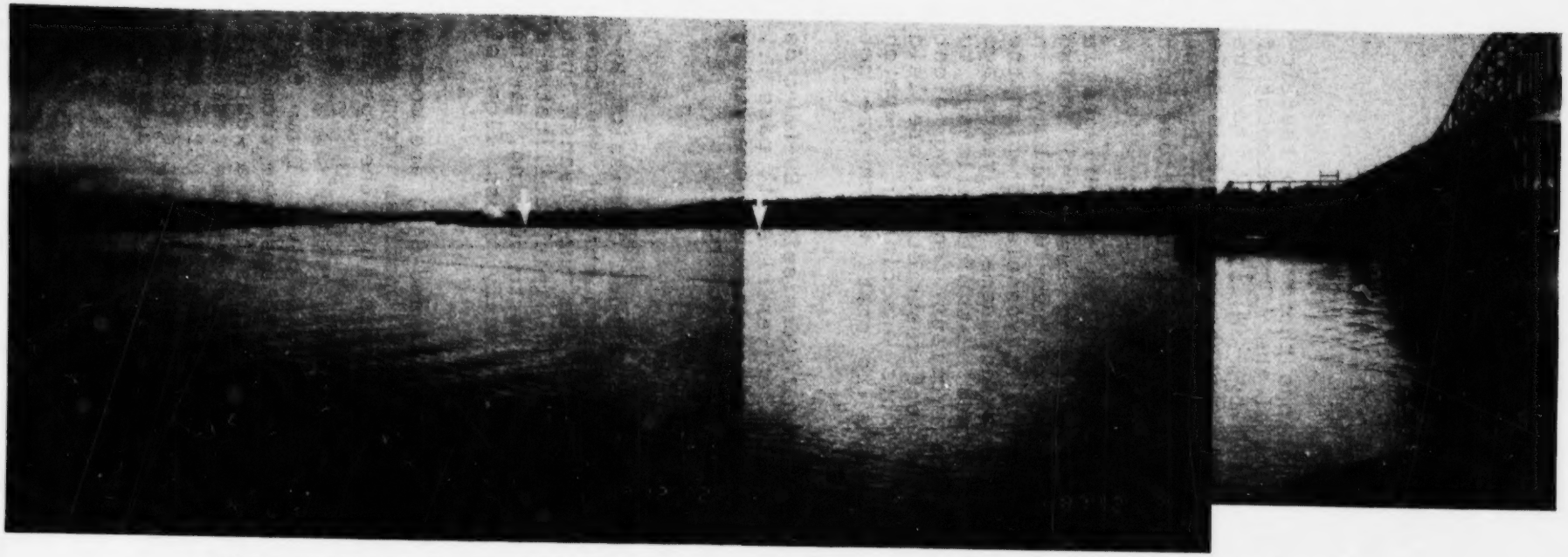
However the Fraser River harbour Commission By-Laws do require in section 58(14) that 'no vessel shall pass ... through the swing span unless the vessel and everything that it has in tow is under complete control'.

2. Approach to the Bridge

Section 65 of the Fraser River Harbour Commission By-Laws requires that any vessel passing through the open draw of the railway bridge shall use the channel that lies on the port side of the vessel. This facilitates a downbound vessel's approach to the south opening, taking into account the pronounced northerly cross flow of current at the bend in the river.

The two unlit conical red buoys (S38 and S40) are moored some 300 and 600 m respectively, upstream from the bridge in order to guide the vessels into the opening (see photograph).

Local knowledge indicates that the river flow from Sapperton Dyke, located some two miles upstream from the bridge, follows the river bank and turns from a westerly direction to south-west, however there is some residual cross current occasionally setting toward the north bank of the river causing downbound mariners to keep close to the buoys S40 and S38 in order to make a good approach



View upstream from north shore.
Note buoys S40 and S38.

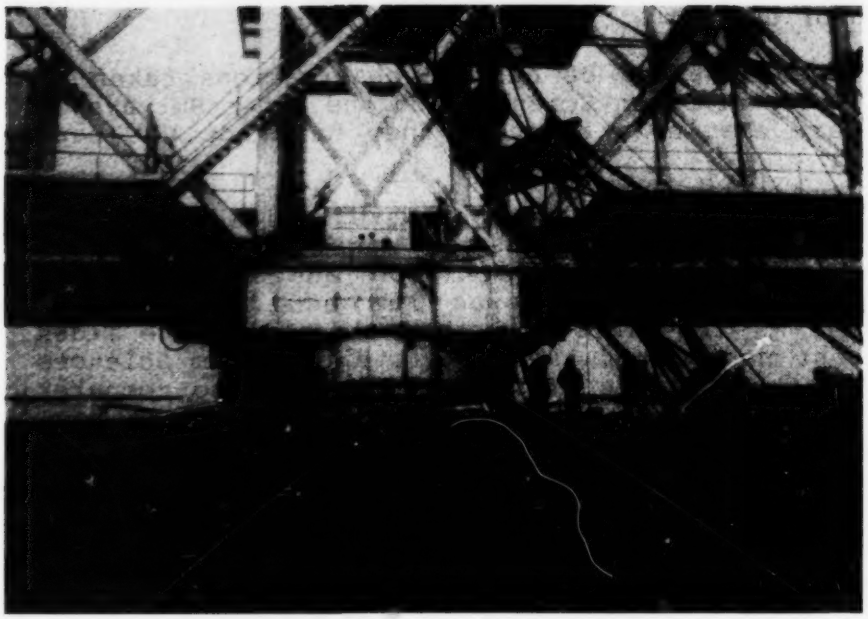
Vue en amont du côté Nord.
Voir les bouées S40 et S38

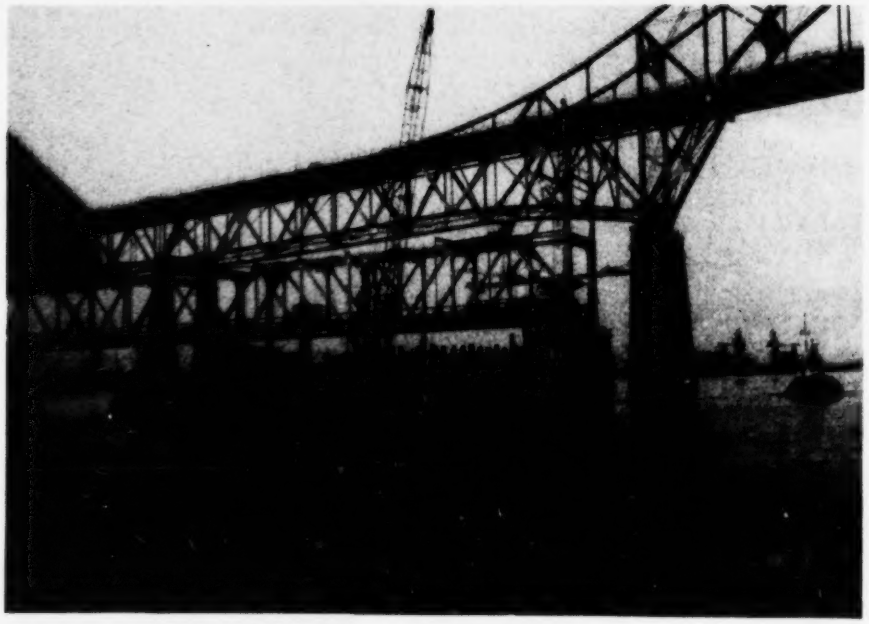
to the south opening at the bridge.

3. Strength of current

A considerable number of current observations taken by the Institute of Ocean Sciences and the Water Surveys of Canada, are available however, they have not yet been published.

Since local current observations were not made when the incidents occurred, a computer model, based on the observed tides at Point Atkinson and the observed discharges at Hope B.C., was run and the currents calculated for the times of both incidents by the Tides and Current section of the Institute of Ocean Sciences at Sidney, B.C. Based on experience with the computer model, the figures arrived at, for all practical purposes, are considered accurate.





Repairs in progress. Réparations en cours.

CHAPTER 4

General Findings

- The passage is narrow, being only some 49 m, and must be considered a difficult transit for a large tow, particularly in heavy current conditions.

- Both casualties occurred when passage of the bridge was attempted with a following current.

- There are no local regulations governing operations through the New Westminster Railway Bridge in adverse weather conditions.

- The New Westminster Railway Bridge was designed for marine and rail traffic as envisaged at the turn of the century.

MARINE CASUALTY INVESTIGATIONS
TRANSPORT CANADA
8TH FLOOR, EXPORT BUILDING
OTTAWA, ONTARIO
K1A 0N5

DECEMBER 1988.